# COMPLETE SYLLABUS OF AVIATION METEOROLOGY IS AS FOLLOWS

## 1. Aviation Meteorology

### 1.1 The Atmosphere

**a) Composition, extent, vertical division**

**b) Temperature**

vertical distribution of temperature – transfer of heat: solar and terrestrial radiation, conduction, convection, advection and turbulence – lapse rate, stability and instability – development of inversions, types of inversions – temperature near the earth's surface, surface effects, diurnal – variation, effect of clouds, effect of wind

**c) Atmospheric pressure**

barometric pressure, isobars – pressure variation with height, contours (isohypses) – reduction of pressure to mean sea level, QFF – surface low/upper-air low, surface high/upper-air high precipitation

**d) Atmospheric density**

interrelationship of pressure, temperature and density

**e) International Standard Atmosphere (ISA)**

### f) Altimetry

pressure altitude, true altitude – height, altitude, flight level – altimeter settings: QNH, QFE, 1013.25 hPa – effect of accelerated airflow due to topography

## 1.2 Wind

### a) Definition and measurement

### b) Primary cause of wind

primary cause of wind, pressure gradient, coriolis force, gradient wind – relationship between isobars and wind

### c) General circulation

general circulation around the globe

### d) Turbulence

Turbulence and gustiness, types of turbulence – origin and location of turbulence

### e) Variation of wind with height

variation of wind in the friction layer

### f) Local winds

Anabatic and katabatic winds, land and sea breezes, venturi effects

### g) Standing waves

origin of standing waves

## 1.3 Thermodynamics

### a) Humidity

water vapour in the atmosphere – temperature / dew point, mixing ratio, relative humidity

## 1.4 Clouds and Fog

### a) Clouds formation and description

cloud types, cloud classification – influence of inversions on cloud development

### b) Fog, mist, haze

radiation fog – advection fog – steaming fog – frontal fog – orographic fog

## 1.5 Precipitation

### a) Development of precipitation

development of precipitation – types of precipitation – type of precipitation, relationship with cloud types

## 1.6 Airmasses and Fronts

### a) Types of airmasses

description, factors, affecting the properties of an airmass – classification of airmasses, modifications of airmasses, areas of origin

### b) Fronts

boundaries between airmasses (fronts), general situation, geographic differentiation – warm front, associated clouds and weather – cold front, associated clouds and weather – Warm sector, associated clouds and weather – weather behind the cold front – occlusions, associated clouds and weather – stationary front, associated clouds and weather – movement of fronts and pressure systems, life cycle

## 1.7 Pressure Systems

### a) Location of the principal pressure areas

### b) Anticyclone

Anticyclones, types, general properties, cold and warm anticyclones, ridges and wedges, subsidence

### c) Non frontal depressions

thermal, orographic – and secondary depressions, cold air pools, trough

### d) Tropical revolving storms

## 1.8 Climatology

### a) Typical weather situations in mid-latitudes

westerly waves – high pressure area – uniform pressure pattern

### b) Local seasonal weather and wind

SE & NE Monsoon, Pre-Monsoon, Northwesters, Kalbaisakhi – Western Disturbance

## 1.9 Flight Hazards

### a) Icing

weather conditions for ice accretion, topographical effects

### b) Turbulence

effects on flight, avoidance

### c) Windshear

definition of windshear – weather conditions for windshear – effects on flight

### d) Thunderstorms

structure of thunderstorms, squall lines, life history, storm cells, electricity in the atmosphere, static charges – conditions for and process of development, forecast, location, type specification – Thunderstorm avoidance, ground/airborne radar, storm scope – development and effect of down bursts – development of lightning discharge and effect of lightning strike on aircraft and flight execution

### e) Low and high level inversions

Influence on aircraft performance

### f) Hazards in mountainous areas

influence of terrain on clouds and precipitation, frontal passage – vertical movements, mountain waves, windshear, turbulence, ice accretion – development and effect of valley inversions

### g) Visibility reducing phenomena

reduction of visibility caused by mist, smoke, dust, sand and precipitation – reduction of visibility caused by low drifting and blowing snow

## 1.10. Meteorological Information

### a) Observation

On the ground – surface wind, visibility and runway visual range, transmissometers; Clouds – type, amount, height of base and tops, movement; Weather – including all

types of precipitation, air temperature, relative humidity, dew point, atmospheric pressure – aircraft observations and reporting, data link systems, PIREPS –

### b) Weather Charts

significant weather charts – surface charts – upper air charts – symbols and signs on analysed and prognostic charts –

### c) Information for Flight Planning

Aeronautical codes: METAR, TAF, SPECI, SIGMET, SNOWTAM, runway report – Meteorological broadcasts for aviation: VOLMET, ATIS, HFVOLMET, ACARS – Content and use of pre-flight meteorological documents – Meteorological briefing and advice – measuring and warning systems for low level windshear, inversion – Special meteorological warnings.